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Halliburton NUS Project Number 2F35

Commander, Atlantic Division
Naval Facilities Engineering Command
Environmental Quality Branch
Norfolk, Virginia 23511-6287

Attn: Mr. Jim Steinberg, Code 1822

Subject: Final Remedial Investigation (RI) Report for Site 29 - Crash Crew Burn Pit
Bogue Field, North Carolina
Contract No. N62470-90-D-7630

Dear Mr. Steinberg:

Enclosed please find five copies of the final RI Report for Site 29-Crash Crew Burn Pit at Bogue Field, North Carolina. Twenty copies have also been sent directly to Renée Henderson. A computer disk containing the report text and tables in Word Perfect format is also provided.

The report has been finalized based on written comments received by the USEPA, the US Fish and Wildlife Service, and The National Oceanic and Atmospherical Administration. Comments have not yet been received by the State of North Carolina and a final version of comments have not yet been received by the US Geological Survey. Therefore, at your request and in the interest of maintaining project schedule, this document is being revised based on the comments received to date.

Most comments received have been incorporated into the final version of the report. Those comments that have not been incorporated into the report are attached and a response is provided with the rationale for not incorporating those comments.

Please contact me with any questions regarding the enclosed documents.

Very truly yours,

Matthew G. Cochran
Project Manager

cc: Ms. Renée Henderson
Ms. Vicki Bomberger

CP-00509-3.01-9/18/92

RESPONSE TO EPA REVIEW AND COMMENTS
DRAFT FINAL RI REPORT
SITE 29 - CRASH CREW BURN PIT
MARINE CORPS AUXILIARY LANDING FIELD (MCALF)
BOGUE, NORTH CAROLINA

GENERAL COMMENTS

2. Overall the document loosely parallels Table 3-13 of the "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" 1988. There are significant omissions; such as, site history, meteorology, demography and land use, ecology, potential routes of migration, Environmental Risk Assessment, and Recommended Remedial Action Objectives.

RESPONSE: The performance of an Environmental Risk Assessment was beyond the scope of this investigation. At the present time, it is believed that environmental receptors are not being impacted by the site. If, it appears in the future that environmental receptors may be impacted by the site, then an Environmental Risk Assessment will be performed at that time. All remaining items in comment #2 were already included in the text or the text has been modified accordingly.

4. During the next round of sampling, ground-water, surface water, soil, and sediment samples should be analyzed for the Target Compound List/Target Analyte List (TCL/TAL) of possible contaminants.

RESPONSE: Additional TCL/TAL analysis is not necessary. Extensive TCL/TAL and PCB analyses were conducted during the 1988 SI as well as TCL analyses on newly installed wells during the RI. Only BTEX compounds and a few of the more soluble PAHs were detected at the site, in addition to a few low detections of phthalate esters. Pesticides are not suspected of being disposed of at the site.

5. The text states that the surficial aquifer is not tidally influenced. Tributaries leading to Goose Creek are tidally influenced and fluctuate as much as one foot during tidal cycles. The stage of these tributaries do not reflect the water levels in the surficial aquifer and should not be used

as accurate data points for the potentiometric surfaces in Figure 4-3 and 4-4. These points can be used to indicate general flow directions in the surficial aquifer but should not be used to calculate the horizontal hydraulic gradient in the aquifer.

RESPONSE: The water level elevations in the surface water bodies were never intended to reflect water levels in the surficial aquifer. However, comparison of surface water levels with groundwater levels does indicate groundwater discharge to surface water bodies. The water level elevations shown on figures 4-3 and 4-4 are representative of the surficial aquifer and the surface water bodies and accurately depict water elevations at the time that the measurements were taken. There is no doubt that tidal influences cause water levels in Goose Creek Tributary to fluctuate on a daily basis and there is no impact on the water levels in the site wells (based on data collected during the RI planning stages). It is therefore, believed that the water level fluctuations in Goose Creek Tributary impact the groundwater only in the nearby vicinity of Goose Creek on an intermittent basis (Along the Creek banks) and have very little impact on the groundwater gradient in the site vicinity.

7. A topographic map of the site and surrounding areas (Bogue Airfield, the town of Bogue, and Goose Creek) should be provided. The map should illustrate the site boundary and surface drainage features that lead to the tributaries north and south of the site that discharge to Goose Creek.

RESPONSE: The topography of Bogue Field is nearly level. The site maps included in the report are adequate for the purposes of a Remedial Investigation and will not be changed.

8. A surface water sample (29SW04) collected in the drainage ditch contained contaminants at concentrations above ambient water-quality criteria. Additional surface water and sediment samples should be collected at the intersection of the drainage ditch and the tributary (north of the site) leading to Goose Creek. Surface water and sediment samples should be collected in the Goose Creek tributary southwest of the site. Samples should also be collected in the marsh areas southeast and northeast of the site.

RESPONSE: Additional surface water/sediment samples in the drainage ditch are not necessary at this time. This is substantiated by the fact that the furthest downstream sample (SW/SD-05) had no detections for site related contaminants. Surface water/sediment samples were collected from the Goose Creek Tributary during the 1988 SI. No site related contaminants were detected in the surface water or sediment samples.

In the future, if it appears that surface water and sediments located southeast and northeast of the site may be impacted, then sampling of these areas will be conducted.

9. Based on the levels of aluminum, manganese, and barium, a new background well should be installed northwest of the site. The furthermost downgradient wells at the site contain concentrations of metals above MCLs. It is possible that the concentrations of metals are due to the collection of turbid ground-water samples. It is recommended that these wells be resampled at low flow rates. The wells should be purged until the values for specific conductance, temperature, and pH are constant. Sediments in the well bore should be allowed to settle an hour or so before ground-water samples are collected. Once time has been allowed to permit sediments to settle in the well bore, ground-water samples should be collected at low flow rates. A peristaltic pump is a good means for collecting non-turbid ground-water samples, especially if the pump is positioned near the top of the water column and lowered in the well as water levels decline during pumping.

RESPONSE: A new background well will not be installed at this time. The objective of the Remedial Investigation is to define the magnitude and extent of site - related contamination and not contamination resulting from background inorganic compounds. It is presently believed that Aluminum and Barium are background contaminants. Manganese may be a site related contaminant, however this compound was detected at a relatively low concentration (105 ug/l, dissolved; 20.3 ug/l, estimated total) in the groundwater sample collected from the background well. These results seem to indicate that a portion of the manganese present in the groundwater is the result of suspended background sediment. If, in the future, site related contaminants are detected

in samples collected from the background well, then an additional background well will be installed.

Resampling of all site monitoring wells for dissolved and total TAL inorganic compounds will be conducted for 3 consecutive quarterly sampling rounds. The data will be used to further evaluate background versus site related inorganic compounds. All wells will be redeveloped prior to sampling to minimize turbidity.

Specific Comments

3. Page 3-7, 2nd paragraph - What was the rationale for using a "plastic" bailer? Only inert materials should be used for well screens and/or bailers.

RESPONSE: The text was in error and the bailer was made of polyethylene, not plastic. The purpose, as stated in the 3rd sentence in this paragraph, was to visually check for the presence of floating product. The groundwater sampled using the polyethylene bailers was not submitted for chemical analyses.

4. Page 3-8, Section 3.8 - The second paragraph in this section states "Sediment samples were collected by scooping the sediment directly with the sample jar." This method of sample collection is not recommended by EPA. Sediment samples collected for chemical analysis should be thoroughly mixed (except for purgeable organic compound analysis) before being placed in the appropriate containers.

RESPONSE: The area of the stream channel that was sampled was a low flow area with fine sediment materials on the stream bottom. It appeared, based on visual observation, that the sediment had thoroughly mixed prior to deposition, and the sample collected was both representative and mixed. This is supported by the fact that there is little variation in contaminant levels between the duplicate sediment samples collected from location SD-04. The intent of sampling in this manner was to minimize the introduction of sampling equipment that could potentially introduce extraneous sources of contamination into the sample matrix.

9. Page 5-5, 2nd paragraph - The statement, "..Because of this fact, the selected sample location may not be truly representative of background conditions."; indicates that the

results of the background sampling should not be used in the Baseline Risk Assessment.

RESPONSE: The comment seems to arise from the fact that background sample results provided the maximum concentrations of some contaminants. The "background" analytical results are not used to screen out chemicals of concern in the risk assessment. Rather, these samples are handled as though they are on site since they would be contributors to the overall risk to a receptor. This is mentioned in the last sentence in this paragraph: "...the "background" soil sample locations will be included with other sample results."

11. Page 5-10, Section 5.2 - All groundwater samples were analyzed for total (unfiltered) and dissolved (filtered) metals. For purposes of the baseline risk assessment (BRA), EPA Region IV Supplemental Risk Assessment Guidance requests that unfiltered groundwater data be used to determine the exposure point concentrations.

RESPONSE: The risk assessment was performed on the total (unfiltered) groundwater samples, as stated in the first paragraph on page 7-7.

15. Page 5-13, Section 5.2.2. - For risk assessment purposes, only the unfiltered samples have any utility.

RESPONSE: See the response to comment #11. Unfiltered samples provide some information on potential solubility/mobility of metals in the hydrogeologic regime, and can be used in a qualitative manner to elaborate on the potential for contaminant migration (and hence exposure). CERCLA investigations typically include both analyses, and not all data collected during the RI is necessarily used only in the risk assessment.

17. Page 5-17, top of page - Please delete the sentence beginning "... This fact appears to indicate that most metals were present in the sediment..."

RESPONSE: HALLIBURTON NUS considers this to be a perfectly appropriate statement. After all, the purpose of collecting both filtered and unfiltered samples is to determine if this might be the case.

21. Page 7-5, Section 7.2 - The contaminants of concern for the ecological risk assessment are not necessarily the same as the COCs for human health. The COCs for ecological concerns need to be determined for this site.

Also, for each sample medium, a table is needed showing all of the contaminants detected, the frequency of detection, the range of detected concentrations, the arithmetic mean, the 95% UCL, etc. This type of table is usually included for the human health risk assessment; it is also used for evaluating data with respect to ecological concerns.

RESPONSE: A) The ecological assessment is not within the scope of this project.

B) All of this information is presented in either detailed tables in section 5 or in the existing COC tables in Section 7. Rather than repeating some of this information for a 3rd time, references will be made to the tables in Section 5 and the text will be expanded somewhat to relay the information (again) on frequency of detection, etc.

27. Page 7-18 thru 7-20, Table 7-5 - Currently, there are no EPA toxicity values for lead. The oral and inhalation reference dose for lead should be deleted from the table. Since there are no toxicity values for lead available on IRIS or HEAST, EPA believes the best approach to assess lead exposure is to use the UBK Model as a risk assessment tool to predict blood lead levels and aid the risk management decision on soil lead cleanup levels. When lead levels exceed the EPA action levels of 500 mg/kg and 15 ug/L for soil and groundwater, respectively, the model should be run. Site specific values for soil and groundwater should be input into the model.

Table 7-5 contains toxicity values for trivalent chromium only. What is the source of the inhalation reference dose of this compound? Unless analytical data are available that indicate that hexavalent chromium is not present, it should be assumed that at least a portion of the chromium is present in the hexavalent form when assessing risks to potential receptors.

When calculating risk from dermal exposure, toxicity values that are expressed as an administered dose (reference dose or cancer slope factor) must be converted to an absorbed dose. Refer to Appendix A of the Risk Assessment Guidance for Superfund (RAGS), Volume I, for guidance on how to make this conversion. A table should be included in the BRA that summarizes the adjusted toxicity values and absorption efficiencies used to make the adjustment.

The reference dose (RfD) for phenol should be included in the table. The oral RfD for arsenic should be changed to 3E-04 mg/kg-day. An inhalation slope factor of 8.4E+00 $(mg/kg\text{-}day)^{-1}$ should be added for beryllium. The oral RfD for selenium should be changed to 5E-03 mg/kg-day.

The Health-Advisory data for nickel and zinc should be updated to reflect the April 1992 values.

RESPONSE: A) All soil results for lead were less than 500 mg/kg. The lead results for some groundwater samples were in excess of the 15 µg/L action level in only the total metals fraction. Given the level of uncertainty on various input factors for the IUBK model, we feel it is no better than using the revoked RfD, which was based on the MCL of 50 µg/L. In addition, given the fact that it is apparent that at least some of the metals observed in the turbid groundwater samples is due to the presence of suspended soil material, it is not cost effective to continue spending money evaluating risk when the project could be progressing to an "FS" that will meet groundwater standards/risk-based values as cleanup goals.

B) The inhalation RfD for chromium was current at the time of report preparation. It has since been removed from IRIS and will be deleted from this document. The reviewer is reminded that IRIS is updated continuously, and it is not within our negotiated budgets to change items such as this that were current at the time when the calculations were performed for the draft report. Otherwise, unless comments are received essentially instantaneously from reviewers, this will continue to present a problem. In addition, we have no reason to believe that any of the chromium is present in the hexavalent form. None of our prior experience with EPA in any region has required an arbitrary assumption on the potential proportion of hexavalent chromium present without analyses.

C) A summary table will be included in the text to address the absorbed vs. applied issue and the calculations will be modified accordingly.

D) Updated and corrected RfDs, CSFs, and health advisories for arsenic, beryllium, selenium, nickel, and zinc will be incorporated into the risk assessment. Phenol was eliminated as a soil COC during the soil toxicity - concentration screening procedure.

35. Page 7-47, Section 7.5.2, second paragraph, second sentence - As previously stated, Region IV Supplemental Risk Assessment Guidance requests that unfiltered groundwater data be used to calculate exposure point concentrations. Therefore, it is assumed in the BRA that

groundwater samples are unfiltered. Based on this information, the last part of the sentence should be deleted and the sentence should read "Several individual metals had hazard quotients that were greater than unity."

RESPONSE: It is believed that it is important to emphasize that risks are based on unfiltered sample analytical results The text will remain as originally written.

36. Tables 7-15 and 7-16 - The reviewer cannot duplicate the hazard quotient (HQs) for fugitive dust inhalation. Most of the COCs do not have inhalation RfDs, what as the source of the RfD for this pathway?

RESPONSE: While it is true that many of the chemicals considered in this pathway have only oral RfDs, the model and assumptions outlined in Table 7-7 and the associated text indicated that both absorption in the lungs and gastrointestinal tract were considered. While this model is not highly sophisticated in some of its assumptions, the authors feel that it is suitable for the purposes of this assessment (i.e., the absorption assumptions are simple, but in order for the risks via this exposure route to become "unacceptable", the absorption factors would have to be off by 6 or more orders of magnitude).

37. Tables 7-16 and 7-19 - The reviewer could not duplicate the carcinogenic risks presented in these tables. In addition to the intakes, the risk calculations should be checked.

RESPONSE: All calculations will be checked again. It is assumed that, since this comment follows one about fugitive dust exposures, that the reviewer did not note that both an ingestion and inhalation route of exposure are considered in fugitive dust inhalation.

40. Page 7-54 thru 7-57, Section 7.7 - This section is inadequate. Very few ecological concerns were addressed in this environmental assessment. The environmental assessment should follow the guidance provided in the following document:

USEPA, March 1989. Risk Assessment Guidance for Superfund Volume II: Environmental Evaluation Manual. Interim Final. EPA/540/1-89/001, Office of Emergency and Remedial Response, Washington, D.C.

Although the comparison of surface water data from the drainage ditch with the AWQC and the NC Criteria for Class C Surface Water is good, this section also needs to address contaminants present in surface soils and in sediment and the potential for contaminants to migrate into the ditch and Goose

Creek via ground-water discharge, (See Section 4.3, page 4-4). Since there are currently no sediment criteria (although they will be promulgated soon for a few organic chemicals), the sediment data should be compared to the NOAA (National Oceanic and Atmospheric Administration) ER-L (Effects Range - Low) and ER-M (Effects Range-Median) sediment values, found in the following reports:

Long, Edward R., and Lee G. Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52. Office of Oceanography and Marine Assessment, Seattle, WA.

A habitat/biota survey is needed for the site and nearby areas, including contaminant migration pathways such as the drainage ditch and (potentially) Goose Creek, to determine potential ecological receptors. This information should be obtained through a site reconnaissance, aerial photographs of the area, a review of literature about the general area, etc. Figure 2-3 (General Site Features), page 2-6, can be used as a base map for generating a habitat map for the site and nearby areas. Information is also needed concerning endangered or threatened species found in the area and any wetlands or other sensitive environments located on or near the site.

RESPONSE: A detailed ecological assessment as requested was beyond the scope of this project. Additional potential migration pathways will be addressed in more detail, however, the reviewer is reminded that the nearest water body is a drainage ditch with many analytical results in the downstream samples less than the upstream or near-site results. Therefore, adverse effects have not been documented even in the ditch, much less expanding the coverage to include Goose Creek, which is located 1200 feet downstream.

41. Page 8-1, Section 8.0 - The conclusions and recommendations appear to be based only upon human health concerns. Ecological concerns must also be included in this section.

RESPONSE: No ecological concerns have been documented as downstream surface water concentrations (except iron) are all below AWQC/state criteria, and that downstream sediment concentrations are not consistently elevated over the upstream concentrations.

RESPONSE TO NOAA REVIEW AND COMMENTS
DRAFT FINAL RI REPORT
SITE 29 - CRASH CREW BURN PIT
MARINE CORPS AUXILIARY LANDING FIELD (MCALF)
BOGUE, NORTH CAROLINA

Comments:

The data presented in the RI report do not reveal that contaminants associated with the Bogue site pose a significant threat to NOAA trust resources. However, limited pathway sampling has been conducted and the overall investigation at MCALF Bogue has not been sufficient to adequately measure risks to aquatic resources.

Additional investigations should be conducted to determine the extent of groundwater contamination and discharge points into surface waters. Surface water and sediment samples should be collected from additional locations along the Drainage Ditch, Goose Creek, and from depositional areas southwest of the burn pit to determine if contaminants have been transported to downgradient receptor sites. Biological assessments in the creeks may be required to evaluate the effects of contaminants identified by chemical analyses. Consideration should be given for analysis of surface soils for dioxins to determine if these compounds were produced as a byproduct of burning at the site.

The effects of tidal influence on both surface water and groundwater should be considered during the investigation. Tidal influence may be affecting the water quality of upgradient wells.

Because of the broad use of estimated values for contaminant concentrations in the RI report, substantiation of the data provided in the RI is inappropriate.

The issue of primary concern to NOAA relative to MCALF Bogue is the potential for off-site contaminant migration into Goose Creek, Taylor Bay and Bogue Sound. Numerous resources of concern to NOAA use Goose Creek and water surrounding the base throughout the life cycles. The site could be of prime concern to NOAA if contaminants, particularly persistent trace elements and TPHs, are migrating off-site at concentrations known to adversely affect aquatic resources.

NOAA recommends that off-site migration routes be evaluated for inclusion in the baseline risk assessment. Additional sampling of surface water and sediments is recommended to evaluate the potential for transport of contaminants off-site to downstream receptors. If off-site contaminant transport from this site is found to occur, the Ecological Risk Assessment for MCALF Bogue should fully address threat to NOAA trust resources.

Response:

A) See response to EPA general comment #2.

B) See response to EPA general comments 2 and 8. There is no historical evidence of chlorinated organic compounds being disposed at the site which, when burned, can result in dioxin compounds forming.

C) See response to EPA general comment #5.

D) Extensive data validation activities were performed during the evaluation processes resulting in estimation of some of the data. Conservative factors were used to develop risk estimates and it is accepted practice by the EPA to use estimated values in determining risks.

E) See response to EPA general comment #8.

F) See response to EPA general comment #2 and #8.

RESPONSE TO US FISH AND WILDLIFE REVIEW AND COMMENTS
DRAFT FINAL RI REPORT
SITE 29 - CRASH CREW BURN PIT
MARINE CORPS AUXILIARY LANDING FIELD (MCALF)
BOGUE, NORTH CAROLINA

Marine Corps Auxiliary Landing Field, Bogue, North Carolina
Site 29 - Former Crash Crew Burn Pit

Data on the nature and extent of contamination at this site indicate a low potential for adverse impacts to fish and wildlife resources. However, we are concerned with the high detection limits, in excess of 6,600 parts per million, for petroleum hydrocarbons in sediment reported in Table 5-9. Petroleum hydrocarbons represent the dominant class of site-related contaminants for the burn pit, but the detection limits reported are not sensitive enough to discern potential off site contaminant migration by comparison of up-gradient versus down-gradient results.

Response: The TCL/TAL analyses performed on the sediment samples appear to corroborate the belief that contamination in sediments is low. The sediment samples were analyzed in accordance with EPA methods and the method detection limits were met.